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Fattening Lambs

J.W. Wilson

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DEPARTMENT OF ANIMAL HUSBANDRY

FATTENING LAMBS

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ERRATA

On page 649 read-hay 30 cents per hundr[illegible] . Page 656 SUMMARY omit-in forty-four days

FATTENING LAMBS

JAMES W. WILSON

The live stock industry has been and is a prominent factor in solving the problem of retaining and improving the fertility of the soil. It has been demonstrated that raising crops year after year on the same land and selling them in their natural form, without the use of animals to produce manure, materially impairs the producing capacity of the soil. Commercial fertilizers are used extensively farther east, which render the cost of production comparatively expensive.

Roberts, of the New York Experiment Station, found that sheep manure was worth more per ton as a fertilizer than that made by any other farm animal.

To sheep belongs part of this credit as economical producers, requiring less than the average number of pounds of feed for the production of a pound of gain. In former years many of the sheep raised in South Dakota were shipped to eastern feed lots and fitted for market on rape pasture and a small allowance of grain. After careful inquiry it is learned that these feeders figure on a profit of not less than one dollar per head. This profit is obtained by the increase in value of the original weight and gain put on during the short feeding period while on rape pasture.

The sheep has no equal as a weed destroyer, eating nearly all the numerous weeds and grasses found on every farm. From all reports the sheep industry is increasing in the state, although the days of raising sheep in large flocks for the feeding market are slowly passing away. In the older settled sections many flocks have been established recently, which

will more than offset the loss of the large number formerly raised on the range. By this better care the lambs will be better fitted for the butcher and will command a higher price in the market than formerly.

Although sheep raising is one of the most profitable industries on the farm, in some of the most densely populated sections of this state, where the farms are highly improved, where large yields of grain are obtained annually, and where during the past few years the price of the land has trebled, the fattening of sheep for market is practically unknown.

This Bulletin presents the results obtained in two feeding experiments with lambs. The first experiment was to determine the relative value of alfalfa hay and upland prairie hay with the same kind of grain ration; the second was to determine the value of different grain rations for lambs while on rape pasture.

The question of producing the cheapest pound of gain should be kept in mind when fattening lambs for market, and these results are intended to furnish the fitter an idea of the value of cheap fodder and pasture in mutton production.

EXPERIMENT NO. 1

FATTENING LAMBS ON ALFALFA AND PRAIRIE HAY

The successful introduction of hardy varieties of alfalfa into different section of South Dakota in the near future will have a great bearing on the live stock industry. This legume will furnish to a large extent the protein desired to feed with the highly carbonaceous grains. It is a palatable and a highly digestible feed. If properly made into hay it serves as a conditioner for all kinds of live stock during the long winter when green forage is not at hand.

The results of an experiment with hogs at this Station in feeding the same kind of a grain ration on blue grass, clover, and alfalfa pastures, show that the gain for the lot receiving alfalfa, during the same period, was fifteen pounds greater

than the gain for lot receiving blue grass pasture, and six pounds greater than the gain for the lot receiving clover pasture.

The adaptation of different varieties of alfalfa to various conditions of South Dakota under the auspices of the United States Department of Agriculture is now in progress, and it is hoped that as a result of the introduction into the Northwest of the hardiest alfalfas of the world, varieties will be found especially suitable to each set of soil and climatic conditions.

The upland prairie hay of the Northwest is widely known, throughout the markets, for its highly nutritious qualities.

During the winter of 1908 twenty grade lambs from eight to ten months of age, raised on the college farm, were divided into two lots and weighed up for the experiment. From the tables of weights and gains it may be seen that there were only three pounds difference in the aggregate weight of the two lots. The object was to determine the value of these two hays with the same kind of grain ration for the production of a pound of gain. The lots were given the same number of pounds of grain daily and all the hay they would eat up clean. The grain ration for each lot consisted of a mixture of one hundred pounds of oats, one hundred pounds of shelled corn and twenty-five pounds of linseed meal. The lots were started on one pound per head of this mixture per day and increased until they were receiving two and two-tenths pounds of grain daily.

For every pound of grain fed the lambs, the alfalfa lot consumed one and three-tenths pounds of hay. For every pound of grain fed the prairie hay lot, the lambs consumed one pound of hay. In other feeding experiments with lambs of this age at this Station about two pounds of grain per head daily was an average allowance when on full feed.

TABLE OF WEIGHTS AND GAINS

ALFALFA HAY LOT

Number of Lambs	Weight January 24	Weight February 25	Weight March 25	Gain	Gain per Head Daily
325	99	114	132	33	.54
318	100	115	130	30	.49
1000	84	97	113	29	.47
342	73	90	113	40	.65
343	85	100	115	30	.49
321	93	115	131	38	.62
339	86	103	117	31	.50
316	92	108	124	32	.52
327	92	107	114	22	.36
353	73	87	101	28	.46
Total and averages	877	1036	1190	313	.51

PRAIRIE HAY LOT

349	86	98	106	20	.33
348	77	91	103	26	.42
302	94	103	114	20	.33
344	107	117	126	19	.31
1032	68	90	101	33	.54
1001	86	92	106	20	.33
315	75	79	84	9	.14
359	99	118	132	33	.54
1024	102	117	137	35	.57
1049	80	86	99	19	.31
Totals and averages	874	991	1108	234	.38

Without exception the gains made by the alfalfa lot are the largest ever obtained in a feeding experiment with lambs at this Station. This table shows that the individual gains varied from thirty-six hundredths (.36) to sixty-five hundredths (.65) of a pound daily, and an average gain per head daily of fifty-one hundredths (.51) of a pound.

Bulletin No. 86 of this Station (edition now exhausted) shows that where ten different grain rations, with prairie hay, were fed to lambs for the purpose of fattening, the average gain per head daily ranged from twenty-two hundredths (.22) to twenty-nine hundredths (.29) of a pound.

TABLE NO. I

Kinds of Feed Fed	No. Lambs in Lot	Pounds of Grain Consumed	Pounds of Hay Consumed	Total Gain	Pounds of Grain for Lb. of Gain	Pounds of Hay for Lb. of Gain	Cost of Producing a Lb. of Gain—Cents
Alfalfa hay and grain mixture..	10	967	1238	313	3.08	3.95	4.2
Prairie hay and grain mixture..	10	967	940	234	4.12	4.01	5.3

The above table shows the number of lambs, pounds of grain consumed, pounds of hay consumed, total gain, pounds or grain for pound of gain, pounds of hay for pound of gain, and the cost of producing a pound of gain with each lot.

The mixture, consisting of corn, oats and linseed meal, is figured at one cent per pound, the hays at three cents per pound, and the finished product at seven cents (7c) per pound. These records show that by feeding all the hay each lot would consume and the same daily allowance of grain, the extra two hundred and ninety-eight pounds of alfalfa hay produced an additional gain of seventy-nine pounds. By feeding alfalfa hay it required one and four hundredths (1.04) pounds less of grain to produce a pound of gain than it did with upland prairie hay.

The reason for this marked increase in gain no doubt was due to the succulency and the large per cent of protein contained in the alfalfa hay, rendering the ration more suitable as the ideal balanced ration for lambs.

EXPERIMENT NO. 2

FATTENING LAMBS ON GRAINS AND RAPE PASTURE

Rape has been used as a forage plant in the Northwest for several years, and many claims have been made as to its value for fattening lambs. The practice in some sections is to sow rape with the small grain in the spring and also in the corn

field at the last plowing. After the grain is cut the rape makes a rapid growth and furnishes an abundance of succulent feed until severe frosts. After an unsuccessful attempt in 1907 to secure an average stand of rape by sowing with grain, a field containing about six acres was sowed the following years without a nurse crop at the rate of four to six pounds to the acre. The variety used was the Dwarf Essex. Rape needs a well prepared seed-bed and a soil rich in humus or decayed vegetable matter. The soil should be well drained. Good results have been obtained by sowing rape in lots on college farm that had been rooted up by hogs. In a feeding experiment with hogs at this Station, rape pasture was found to be worth $7.04 per acre (Bull. No. 90), this being the value of the gain of lot that received rape over lot that did not receive rape pasture. Farmers' Bulletin No. 49, United States Department of Agriculture, reports the following on rape:

"This crop is one that has many advantages for summer feeding breeding ewes. It grows rapidly, producing a large quantity of succulent food, and is greatly relished by sheep. About two months is required for the growth of a crop. It remains fresh in the field for over a month under usual conditions after the first cutting has been made. At the Wisconsin Station 62 ewes, 26 ewe lambs, and 5 rams were fed from 300 to 350 pounds of rape daily throughout the drought of August and September. From August 16th until September 17th 9.75 tons by actual weight were cut from 0.5 acre, or at the rate of 19.5 tons per acre.

"In cutting rape at different heights, the best results were obtained from cutting about four inches from the ground. Two cuttings were made from the piece so treated, one August 29th and the other November 6th, and the yield was at the rate of 36 tons per acre.

"There are exceptional possibilities in well-grown rape for fattening lambs, if it is fed with proper judgment and care. It may be fed to best advantage in the early fall, and hence

is of valuable assistance in fattening lambs for the fall or early winter market. It supplies a vast amount of food of which the lambs are very fond, and, as it withstands drought and early frost better than most succulent fodders, it is a crop that may be relied upon with at least common certainty. The first trials reported with rape for fattening lambs were made in England about 1845. Ten wethers fed on rape alone from August 10th to September 21st made an average increase in the six weeks of twenty pounds, or two pounds per head weekly.

"The most extensive trials in feeding lambs on rape have been carried on at the Ontario Experimental Farm. In 1890, 54 acres of rape pastured 17 head of steers and 537 sheep, and one acre of the rape sustained 12 lambs for two months. It is estimated that the food provided by an acre of rape was worth $16.80. In another trial rape alone was fed to 60 lambs, and they were kept on 2.18 acres for twenty-five days, during which time they increased in weight 390 pounds, or an average weekly increase per head of 1.82 pounds. Again, in an experiment on one-sixth of an acre, 6 lambs were kept for forty-two days, and from this it is concluded that one acre would have pastured 36 lambs two months and have made 762 pounds of mutton.

"At the Michigan Station 15 acres of rape pastured 128 lambs for seven and a half weeks, with a total gain of 2,890 pounds. At this rate it is estimated that one acre would pasture 9 lambs seven weeks, and they would produce 202.5 pounds of increase. It is stated that the field would unquestionably have pastured 10 lambs for the period of ten weeks."

Rape has a comparatively narrow nutritive ratio, since it contains a large per cent of digestible protein to the per cent of digestible carbohydrates, in this respect resembling clover and alfalfa. Each animal requires certain quantities of these elements in his daily ration for the best gains, and whether the elements are bought in the market in the form of by-products such as linseed meal, cotton seed meal, or any other

highly proteinaceous substance, or whether it is grown on the farm, the result in feeding is the same.

The following experiment was conducted at the South Dakota Experiment Station during September and October, 1908 and 1909. Each year forty-eight (48) head of lambs were purchased, divided into four different lots of twelve (12) head each, and weighed up for the test. Each lot was provided with a small house for shelter in case of storm. Lot 1 received rape pasture alone, Lot 2 received rape pasture and shelled corn, Lot 3 received rape pasture and oats, and Lot 4 received rape pasture and barley. With the exception of Lot 1, each lot was given what grain it would eat up clean. The first test extended over a period of forty-four days, and the second test covered a period of thirty-one days. On account of the dry weather and early killing frosts in 1909, which stopped the growth of rape, it was impossible to cover the same number of days as in 1908.

For this reason the results of our second year's work are not so good as they are for the first year.

TABLE OF WEIGHTS AND GAINS

LOT I—RAPE PASTURE

1908 Experiment				1909 Experiment			
Weight at Beginning September 3	Weight at End October 17	Gain	Gain per Head Daily	Weight at Beginning August 31	Weight at End October 1	Gain	Gain per Head Daily
75	93	18	.40	76	95	29	.93
55	72	17	.39	67	79	12	.39
73	91	18	.40	63	72	9	.29
64	72	8	.18	67	79	12	.39
73	92	19	.43	52	58	6	.19
62	81	19	.43	72	81	9	.29
75	89	14	.31	61	72	11	.35
74	94	20	.45	78	83	5	.16
63	80	17	.39	71	81	10	.32
66	85	19	.43	69	80	11	.35
71	82	11	.25	62	75	13	.42
60	77	17	.39	.....	.....	.....	.....
811	1008	197	.37	738	855	117	.34

LOT II—RAPE AND CORN

73	94	21	.48	70	81	11	.35
59	78	19	.43	50	63	13	.42
80	97	17	.39	69	81	12	.39
78	94	16	.36	57	59	2	.06
67	75	8	.18	66	79	13	.42
75	93	18	.40	64	77	13	.42
61	76	15	.34	69	83	14	.45
78	92	14	.32	77	83	6	.19
78	96	18	.40	72	86	14	.45
73	91	18	.40	73	83	10	.32
72	86	14	.31	70	76	6	.19
.....	.....	.....	.....	51	56	5	.16
794	972	178	.37	788	907	119	.32

Lot II, consisting of twenty-three lambs, and receiving what corn they would eat both morning and evening while on rape pasture, did not gain as many pounds as the twenty-three head receiving rape pasture without grain.

The individual gains for Lot II either year are not so uniform as for Lot I, showing that while the lambs consumed the corn, it interfered with the fattening process. The average gain of the twenty-three head of lambs on rape pasture without grain for the two years was 13.65 pounds, while the

average gain for lots receiving rape and corn for two years was 12,91 pounds per head.*

TABLE OF WEIGHTS AND GAINS

LOT III—RAPE AND OATS

1908 Experiment				1909 Experiment			
Weight at Beginning September 3	Weight at End October 17	Gain	Gain per Head Daily	Weight at Beginning August 31	Weight at End October 1	Gain	Gain per Head Daily
69	91	22	.50	60	77	17	.55
79	98	19	.43	56	75	19	.61
82	94	12	.27	82	95	13	.42
78	93	15	.34	78	89	11	.35
74	95	21	.48	69	85	16	.52
74	93	19	.43	65	74	9	.29
71	93	22	.50	65	75	10	.32
71	91	20	.45	66	78	12	.39
76	96	20	.45	66	74	8	.26
71	84	13	.29	66	74	8	.26
63	87	24	.54	63	70	7	.22
75	95	20	.45	51	64	13	.42
883	1110	227	.43	787	930	143	.38

LOT IV—RAPE AND BARLEY

68	80	12	.27	61	71	10	.32
72	91	19	.43	56	68	12	.39
62	84	22	.50	71	81	10	.32
73	94	21	.48	66	73	7	.22
65	83	17	.39	75	85	10	.32
67	85	18	.40	72	84	12	.39
69	94	25	.57	78	94	16	.52
56	71	15	.34	75	91	16	.52
72	91	19	.43	55	69	14	.45
71	85	14	.32	56	70	14	.45
62	86	24	.54	73	85	12	.39
70	92	22	.50	50	58	8	.26
807	1036	229	.43	788	928	140	.37

The twenty-four lambs receiving what oats they would eat morning and evening made the largest gain of the four lots, being fifteen and forty-one hundredths (15.41) pounds each,

* At the Wisconsin Station sixteen wethers were fed on 0.7 of an acre of rape for twenty-five days, and also ate 153.5 pounds of oats and 97.5 pounds of whole corn. They gained a total of 149 pounds, or a weekly average of 2.6 pounds. Valuing the foods and the wethers at cost, and the selling price of the latter at 4 cents per pound, the rape would be worth $14.48 per acre.

as compared to fifteen and thirty-seven hundredths (15.37) pounds for Lot IV, receiving barley. The lambs in both Lots III and IV for both years made larger and more uniform gains than did the lambs in Lots I or II, showing that oats and barley are better suited for rapid gains for lambs than corn or no grain when on rape pasture. The difference in gain in favor of the oat lot is so small that the value of these two grains may be considered about equal pound for pound for fattening lambs on rape. The average gain for the twenty-four lambs fed rape and oats both years was fifteen and forty-one hundredths (15.41) pounds, while the average gain for twenty-four lambs fed rape and barley was fifteen and thirty-seven hundredths (15.37) pounds per head.*

TABLE NO. II

Kinds of Feed	1908 Experiment					1909 Experiment				
	No. of Lambs	No. Days Fed	Grain Consumed	Gain	Ave. Gain per Head Daily	No. of Lambs	No. Days Fed	Grain Consumed	Gain	Ave. Gain per Head Daily
Lot I, rape	12	44	....	197	.37	11	31	....	117	.34
Lot II, rape pasture and shelled corn	11	44	210	178	.34	12	31	275	119	.32
Lot III, rape pasture and oats	12	44	303	227	.43	12	31	282	143	.38
Lot IV, rape pasture and barley	12	44	313	229	.43	12	31	282	140	.37

Table No. II shows kind of feed, number of lambs, number of days fed, quantity of grain consumed, total gain and average gain per head daily for each lot and for both years.

The grain ration was the same for both years. For the quantity of grain consumed, the lots receiving oats made the best gains each year, although the two lots receiving barley made practically the same gain for grain consumed. Barley as a rule is much higher in price than oats at this time of

* At the Ontario Experiment Station, fifteen wethers were fed on an acre of rape, with 0.5 pound of oats in addition. Besides eating almost the whole of the crop from an acre in fifty-eight days, they also consumd 345 pounds of oats, and gained 23.67 pounds per head, or a weekly increase of 2.8 pounds per head.

the year, hence for economical and quick gains with lambs on rape pasture, oats are to be preferred.

By feeding shelled corn there was a loss each year, as the gains were not so large as they were for the lots receiving the rape pasture alone.

Our results of pasturing sheep and lambs on rape on the college farm and the experiment station have been very satisfactory. An experiment was conducted to determine what conditions must be present to cause bloat when first turning in on rape as follows: Lot No. 1 was put in on the clear rape without any other forage plant accessible and kept there day and night; Lot No. 2 was turned in on a field where they had access to grass in addition to the rape pasture; Lot No. 3 was turned on the rape when the dew was on early in the morning; Lot No. 4 was turned on rape when it was dry. The lambs were raised on the range and were not accustomed to this forage. The result was the same for each lot, all coming through in a healthy condition.

Of the 96 head of lambs weighed up for this experiment, two head are not reported. One died a few days after weighing, and the other was affected with worms.

We believe, however, that care should be taken when turning in on any kind of new forage, as there is danger of the animal gorging himself.

SUMMARY

1. Ten lambs receiving alfalfa hay gained seventy-nine pounds more in forty-four days than did the same number of lambs receiving upland prairie hay, each lot consuming the same quantity of grain.

2. With the three hundred and sixty-nine head of lambs fed at this Station and weighed individually at certain intervals, all receiving practically two pounds of grain when on

full feed, the gains have never before been so large for grain consumed. This shows that alfalfa hay with a grain mixture and a little linseed meal was markedly superior to any other grain or forage ration.

3. It required only three and eight hundredths (3.08) pounds of grain and three and ninety-five hundredths (3.95) pounds of alfalfa hay to make a pound of gain, as compared to four and twelve hundredths (4.12) pounds of grain and four and one hundredth (4.01) pounds of upland prairie hay to make a pound of gain with lambs during same length of feeding period and with the lambs practically of the same weight.

4. Larger and more uniform gains were made with lot receiving alfalfa hay than with lot receiving prairie hay. (See table of weights and gains.)

5. Figuring the price of alfalfa hay and prairie hay the same, it cost one and one-tenth of a cent more per pound to make a pound of gain with the lot receiving upland prairie hay than it did with the lot receiving alfalfa hay.

6. Lambs fed a grain ration of South Dakota oats while on rape pasture made a larger gain than did lambs fed a grain ration of corn while on rape pasture or a grain ration of barley while on rape pasture.

7. With all the experiments at this Station in feeding lambs on rape the loss has not been greater than it is under ordinary feeding operations.

LIST OF AVAILABLE BULLETINS

89 Preliminary Experiments with Vapor Treatments for the Prevention of Stinking Smut in Wheat.
90 Tankage and Other By-products for Pigs; Shrunken Wheat for Swine.
91 Co-operative Vegetable Tests in 1904; Peas, Beans, Sweet Corn, Cabbage.
92 The Milling Qualities of Macaroni Wheat.
93 Plums in South Dakota.
94 Alfalfa and Red Clover.
95 The Treatment of Nail Pricks of Horse's Foot.
96 Forage Plants and Cereals at Highmore Sub-Station.
97 Speltz and Millet for the Production of Baby Beef.
98 Crop Rotation.
99 Macaroni or Durum Wheats. A continuation of Bulletin 92.
100 The Value of Speltz for the Production of Beef and Pork.
101 Forage Plants at the Highmore Sub-Station, 1906.
102 Evergreens for South Dakota.
103 Breeding Hardy Strawberries.
104 Breeding Hardy Raspberries.
105 Stock Food for Pigs.
106 Sugar Beets in South Dakota.
107 Sheep Scab.
108 New Hybrid Fruits.
109 Rusts of Cereals and Other Plants.
110 Progress in Variety Test of Oats.
111 A Study of South Dakota Butter with Suggestions for Improvements.
112 The Killing of Mustard and Other Noxious Weeds in Grain Fields by the Use of Iron Sulphate.
113 Progress of Variety Tests of Barley.
114 Digestion Coefficients of Grains and Fodders for South Dakota.
115 Report of Work for 1907 and 1908 at Highmore Sub-Station.
116 Acidity of Creamery Butter and its Relation to Quality.
117 Sugar Beets in South Dakota.
118 Corn.